

### III. SURFACE WATER ASSESSMENT

#### C. ASSESSMENT METHODOLOGY AND ASSUMPTIONS

##### 1. Methodology for Determination of Use Support Status

Use support assessments were developed by staff of the Office of Water Resources (OWR). Assessments were determined for surface waterbodies by combining information available from a variety of sources including data collected by state, federal and local agencies; universities; and volunteer monitoring organizations. Most of the baseline monitoring consists of quarterly and seasonal sampling programs. As such, measurements of instantaneous concentrations (grab samples) for physical and chemical parameters were assumed to represent the averaging periods specified for ambient criteria. In addition, a single monitoring station is often considered representative of the waterbody for a distance downstream where no significant influences exist that might tend to change water quality or biological and habitat quality.

The past practice of assigning use support status of fully supporting or threatened to waters which had not actually been monitored but instead were evaluated by Best Professional Judgement (BPJ) or landuse knowledge, has been changed. Instead, those waters that have not actually been assessed (evaluated or monitored) for more than 5 years are now being reported as unassessed. This will give a more accurate representation of the waters in the state for which we have data and the areas where monitoring is needed. However, a process of extrapolating an assessment from a monitored site to an upstream or downstream site, as appropriate, was more fully initiated with this report. Due to a potential terminology conflict associated with the application of the fully supporting but threatened category, this category was not generally used during the 2000 305(b) assessments.

Two non-concurrent years of new chemical baseline data are available for the reporting period (1997 and 1999). Quarterly chemical data is available at the 7 USGS stations. A complete set of biological data (45 stations) is available for the reporting period. It is important to note that stations were assessed based on either biological data only, chemical data only, or at some sites both chemical and biological data were available for the assessments. This variation in type of data available at each station makes comparison of the assessments between some sites questionable.

The protocol used for the determination of use support in Rhode Island's surface waters generally follows the EPA 1998 305(b) assessment guidance entitled *Guidelines for Preparation of Comprehensive State Water Quality Assessments (305(b) Report) and Electronic Update*, September 1997. These protocol differ moderately from those used for the 1994 and 1996 reports. One major change is the elimination of an Overall Use Support category where all the use support assessments are summed to give one overall evaluation of the waterbody. Instead, evaluations are now given only for each of the use assessment (aquatic life, shellfishing, etc.) categories.

The 305(b) guidance suggests following the policy of Independent

Application when making use support decisions. According to this policy, if any one of the three types of monitoring data (biological, chemical, or toxicological) indicates impairment of water quality standards, this should be taken as evidence of impairment (partially supporting, not supporting) regardless of the findings of the other types of data. Since this is currently just EPA guidance, states have the authority to use BPJ when making use support decisions where independently applied biological, chemical, or toxicological data suggest different assessment results. In most instances, we have chosen to rely more heavily on the biological data, where available, to determine aquatic life use support status. For the 2000 cycle, EPA has greatly enhanced the guidance on, and use of, biological data in making use support decisions. This guidance on use of biological data follows a tiered approach based on level of confidence in the data. Rhode Island has increased biological monitoring of rivers and streams specifically following EPA's Level II Rapid Bioassessment Protocol (RBP).

## 2. Assessment Level

Assessed waters are those waterbodies for which the state makes use support decisions based on actual information. Such waters are not limited to waters that have been directly monitored since it is appropriate in many cases to make best professional judgements based on other information including extrapolating an assessment to apply to an up or down stream site. To encourage reporting on more waters, and to distinguish between assessment bases, EPA has subdivided the term "total assessed waters" into two categories and requests that assessments be classified as either:

- i. Evaluated waters - those waterbodies for which the use support decision is based on information or data collected over 5 years ago; is based on qualitative information or BPJ; consists of infrequently collected data (less than quarterly sampling frequency for rivers and less than seasonally for lakes), land use data, location of pollution sources, citizen complaints, non-quality assured citizen monitoring data, etc.
- ii. Monitored waters - those waterbodies for which the use support decision is principally based on data collected within the previous 5 years with adequate QA/QC and a minimum of quarterly chemical sampling frequency for rivers, seasonally for biological data and lakes monitoring, includes: fixed and non-fixed station data, instream >24 hour survey sampling data, and artificial substrate or Rapid Bioassessment Protocol evaluations.

Table 3C-1 presents the 2000 summary of waterbody sizes monitored and evaluated.

TABLE 3C-1 2000 Summary of Waterbody Sizes Monitored and Evaluated

<b>Waterbody Type</b>	<b>Units</b>	<b>Size Monitored</b>	<b>Size Evaluated</b>	<b>Total Assessed</b>
River	Miles	532.66	116.20	648.86
Lake	Acres	10,424.2	6,130.4	16,554.6
Estuarine	Square Miles	149.3	1.60	150.87

### 3. Use Support Categories

In accordance with Section 305(b) of the CWA, state's are required to survey their water quality for attainment of the fishable/swimmable goals of the Act. The attainment of the CWA goals is measured by determining how well waters support their designated uses. For the purposes of this report, the following five designated uses (See Table 3C-2) were evaluated:

- Aquatic Life
- Shellfishing
- Swimming
- Fish Consumption
- Drinking Water Supply

The State's water quality standards are then used to categorize waters as "Fully", "Partially", or "Not" supporting specific designated uses. Partially and Not Supporting use assessments are collectively considered "Impaired" water quality conditions. Table 3C-3 gives a general description of the levels of use support. In the assessments, use support status is determined by comparing available water quality information to the water quality standards.

There are specific criteria for determining attainment of the individual designated uses. EPA guidance discusses the criteria and protocol that should be followed in the assessment methodology. In general, our assessment methodology follows the EPA guidance. The designated uses are assessed independently in the following manner:

i. Aquatic Life - Aquatic life use assessments were based on chemical data or biological data or a combination of chemical and biological data. Water chemistry data were evaluated for conventionals (dissolved oxygen, pH, temperature, secchi depth, chlorophyll a) and toxicants (priority pollutants) concentrations and compared to applicable water quality criteria. Biological data were evaluated based on physical habitat and biological community relative to a reference station. The use is considered **fully supporting** when the data indicate an attainment of acute aquatic life criteria (no more than one exceedance of the criteria in a three year period) and biological evaluations show no evidence of community modifications. Minor exceedances of chemical criteria may be out-weighted by biosurvey results which demonstrate support of the use. This is generally the rule followed if the chemical data is limited or not as recent as the biological data. The use is **partially supported** when the macroinvertebrate population indicates less than full support through any apparent moderate modification of the community. Waterbodies are categorized as partially supporting the use if, for any one pollutant, there is an exceedance of the water quality criteria (acute or chronic) more than once in 3 years but in  $\leq$  10% of the samples. The use is considered **not supporting** if there is severe adverse modifications of the biological community and/or there are severe or frequent ( $>10\%$  of the samples) violations of the chemical water quality criteria.

ii. Shellfishing - Shellfish harvesting use assessments are based on bacteriological monitoring data of the shellfish harboring waters of the state as supplied by the OWR's Shellfish Growing Area Monitoring Program. The use is considered **fully supporting** when there are no

shellfishing restrictions in effect. The use is **partially supported** when the waterbody has a seasonal or conditional closure associated with it. The use is **not supporting** when the waterbody is permanently closed to shellfishing. There are several estuarine areas that are closed to shellfishing strictly due to policy closures. In those areas where the actual water quality attains the shellfish standards, the shellfishing use is considered fully supporting.

iii. Drinking Water Supply - Drinking water use assessments are conducted by and based upon data supplied by the RI Department Of Health (RIDOH). The data consists of ambient (source) water quality data, and information about the level of treatment required and finished water quality. The use support status was based on violations of the MCLs, use restrictions, and/or best professional judgement (BPJ) by the DOH staff. Waters were considered **fully supporting** when there were no violations of MCLs and no restrictions or advisories, and no requirement of more than conventional treatment. **Fully supporting but threatened** was applied to waters which met criteria but where the integrity of the drinking water supply system was considered threatened by nonpoint sources of pollution, often resulting in occasional taste and odor problems and/or in waters where regulated contaminants were detected but not above the MCL. This category was applied to one drinking water supply where the naturally dark color of the reservoir, due to tannic acid staining, required additional treatment. The use was considered **partially supporting** where one or more parameters violate the MCLs, treatment beyond conventional treatment may be required, and frequent taste and odor problems occur. The use was considered **not supporting** if many and frequent violations of the MCLs were observed and one or more contamination-based closures of the source water occurred.

iv. Swimming - The assessment of swimming use was based on fecal coliform bacteria data. The use was considered **fully supporting** when bacterial criteria (geometric mean is met) for primary contact were attained. **Partially supporting** was applied to waters where the geometric mean was met but more than 10% of samples exceeded 500MPN per 100mL. The use was considered **not supporting** if the geometric mean was not met.

v. Fish Consumption - The assessment of fish consumption is still under review and development by the state due to the limited data available. For this report, the use was considered **impaired** where there was a "no consumption" of fish in effect for the general population for one or more fish species. Fish consumption use for all other waterbodies is considered unassessed at this time.

TABLE 3C-2

**DESIGNATED USES**

Aquatic Life - The waterbody provides suitable habitat and water quality for survival and reproduction of desirable macroinvertebrates and supports a healthy macroinvertebrate community.

Shellfish Harvesting - The waterbody supports a population of shellfish and is free from pathogens that could pose a human health risk to consumers.

Drinking Water Supply - The waterbody can supply safe drinking water with conventional treatment.

Swimming - People can swim or engage in other primary contact recreational activities in the waterbody without risk of adverse human health effects.

Fish Consumption - The waterbody supports fish free from contamination that could pose a human health risk to consumers.

TABLE 3C-3

**LEVELS OF USE SUPPORT**

USE SUPPORT LEVEL	WATER QUALITY CONDITION	DEFINITION
Fully Supporting	Excellent/Good	Water quality meets designated use criteria.
Fully Supporting but Threatened	Good	Water quality supports beneficial uses now but may not in the future unless action is taken.
Partially Supporting	Fair (impaired)	Water quality fails to meet designated use criteria at times.
Not Supporting	Poor (impaired)	Water quality frequently fails to meet designated use criteria.
Not Attainable	Poor	The state has performed a use attainability study and documented that use support is not achievable due to a natural condition or human activity that cannot be reversed without imposing widespread economic and social impacts.

#### 4. Section 303(d) Waters

Section 303(d) of the CWA requires that each State identify waters for which existing required pollution controls are not stringent enough to achieve State water quality standards. The section 303(d) list provides a comprehensive inventory of waterbodies impaired by all sources, including point sources, nonpoint sources, or a combination of both. These waters are referred to as "water quality limited." Rhode Island develops this list from the 305(b) assessments. Any waterbody which has a partially or not supporting assessment for any use is placed on the 303(d) List.

States are required to rank their water quality-limited segments by priority and establish Total Maximum Daily Loads (TMDLs) for them. The TMDL process provides an analysis and identification of the relative contribution of each source to the impairment. The TMDL also identifies the sources and causes of pollution or stress, e.g., point sources, nonpoint sources, or a combination of both, and establishes allocations for each source of pollution or stress as needed to attain water quality.

Rhode Island has recently developed a 2000 303(d) waterbody list with TMDL prioritization. Copies of the 2000 303(d) list are available from the OWR, Watersheds and Standards Section at (401) 222-3961 or from the RIDEM website at [www.state.ri.us/dem](http://www.state.ri.us/dem). Figure 3C-1 shows the RI 2000 303(d) Impaired Waters.



Figure 3C-1. RI 2000 303(d) Impaired Waters

